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CONTENTS

MSS. intended for publication and books, etc., intended for review should be sent to Professor J. McKeen Cattell, Garrison-on-Hudson, N. Y.

SIMON NEWCOMB

THE numerous published biographical sketches of Simon Newcomb all fail to set forth accurately the full extent of the world-wide recognition of his contributions to scientific knowledge, and the breadth of his interests and activities. No other American scientist has ever achieved such general recognition of eminence. It seems desirable, therefore, to assemble the facts to fill this lacuna.[1] The plan which Monsieur Lebon has employed in the admirable *Savants du Jour* series suggested the form of the following synoptic notes.

These notes were prepared several years ago in consultation with members of Professor Newcomb's family, and after inspection of his remarkable collection of diplomas, medals, decorations, and certificates of membership and of other honors. This collection became the property of the nation in 1909, and it is now prominently displayed in the historical section of the National Museum in the Smithsonian Institution at Washington.

Born at Wallace, Nova Scotia, March 12, 1835

1853: Came to the United States.

1854: Teacher in a country school at Massey's Cross Roads, Kent Co., Md.

1855: Teacher in the village school at Sudlersville, Md.

1855, May 26: First publication, a letter in *The National Intelligencer*, Washington, D. C.

1857, Jan.–Sept. 1861: Computer in the Nautical Almanac office, then located at Cambridge, Mass. (it has been in Washington, D. C. since 1866). See also 1860, 1861.

1858, July 2: B.Sc., Harvard University, Cambridge, Mass. See also 1875, 1879–80, 1884, 1898–99, 1906.

[1] A complete bibliography of Newcomb's life and works, by the writer, will soon be published elsewhere.

1859, Aug.: Elected Member of the American Association for the Advancement of Science. See also 1874, 1876.

1860: Nautical Almanac office dispatched an expedition, in charge of S. Newcomb and W. Ferrel, to observe the total solar eclipse, in July, north of Lake Winnipeg, Canada. See also 1857, 1869, 1870, 1878.

1860, Jan. 25: Elected Fellow, in the Division of Mathematics and Astronomy, of the American Academy of Arts and Sciences, Boston. See also 1870, 1880.

1861, Sept. 21: Commissioned Professor of Mathematics in the United States Navy by Abraham Lincoln. See also 1877, 1897.

1863, Aug. 4: Married to Miss Mary Caroline Hassler, daughter of Dr. C. A. Hassler, U. S. N., and granddaughter of Ferdinand Rudolph Hassler, the founder of the U. S. Coast Survey.

1869, Sept. 1: Elected Member of the National Academy of Sciences, Washington, D. C. See also 1878, 1881, 1883, 1902, 1903.

1869: Sent by the U. S. government to Des Moines, Iowa, to observe the Solar Eclipse, Aug. 7. See also 1860.

1870: Sent by the U. S. government to Gibraltar to observe the Solar Eclipse, Dec. 22. See also 1860.

1870, May 24: Elected Associate Fellow (number of such limited to 14 in the Division of Mathematics and Astronomy) of the American Academy of Arts and Sciences, Boston. See also 1860.

1870, Nov. 11: Guest at a dinner of the Royal Astronomical Society Club, London. He was also a guest at dinners of this club on the following dates: Jan. 8, 1875; Jan. 12, 1883; June, 1896; June 9, 1899. See also 1872, 1874.

1871, May 13: Elected Member of the Philosophical Society of Washington. See also 1879–80, 1908.

1871: Appointed Secretary of the Commission, created by Congress for the purpose of observing the Transit of Venus, Dec. 9, 1879, and which organized the expeditions sent out by the United States government. See also 1882.

1872, Nov. 8: Elected Associate Member of the Royal Astronomical Society, London. See also 1870.

1873: Appointed lecturer in Columbian (afterwards George Washington) University. Resigned 1884. See also 1874, 1884.

1873, Aug. 22: Elected at Hamburg a member of the Astronomische Gesellschaft. See also 1887.

1873, Dec. 16: Appointed correspondent of the Observatoire de Paris.

1874: Elected Fellow of the American Association for the Advancement of Science. See also 1859.

1874: LL.D., Columbian University, Washington, D. C., now George Washington University. The following is quoted from the diploma: "Virum clarum Simonem Newcomb coeli dimetiendi stellarumque errantium librandarum peritissimum Legum Doctorem, etc." Since also 1873.

1874, Jan. 19: Elected Correspondent of the Académie des Sciences de l'Institut de France. See also 1895, 1906.

1874, Feb. 13: Awarded the gold medal of the Royal Astronomical Society, London, for his "tables of Neptune and Uranus and other mathematical works." See also 1870.

1875: Offered the directorship of the Harvard Observatory. See also 1858.

1875, Feb. 8: Master of Mathematics and Doctor of Natural Philosophy, University of Leyden, on the celebration of the 300th anniversary of its founding.

1875, July 1: LL.D., Yale University, New Haven. See also 1877.

1875, Nov. 10: Elected a Foreign Associate of the Kungliga Svenska Vetenskapsakademien (Royal Swedish Academy of Sciences), Stockholm.

1875, Dec. 29 (Jan. 10): Elected a Corresponding Member of the Imperatorskaja Akedemija naük (Imperial Academy of Sciences), Petrograd. See also 1896, 1897.

1876, June 27: Elected Corresponding Member of the Königliche Bayerischen Akademie der Wissenschaften, Munich.

1876, Aug. 30: Elected President of the American Association for the Advancement of Science. Delivered retiring address in 1878. See also 1859.

1877: Elected member of the Yale Alumni Association. See also 1875.

1877, Sept. 15: Became the senior Professor of Mathematics in the U. S. Navy—with the relative rank of Captain. Appointed Superintendent of the American Ephemeris and Nautical Almanac Office. See also 1857, 1861, 1906.

1877, Nov. 27: Elected Associate of the Kungliga Vetenskaps-Societeten (Royal Scientific Society), Upsala, Sweden.

1877, Dec. 13: Elected Foreign Member of the Royal Society, London. The number of such members is limited to 50. See also 1890, 1895.

1878: Sent by U. S. government to Separation, Wyoming, to observe the total Solar Eclipse, July 29. See also 1860.

1878, Jan. 18: Elected Member of the American

Philosophical Society, Philadelphia. See also 1903, 1906, 1908, 1909.

1878, May 18: Elected Foreign Member of the Hollandsche Maatschappy der Wetenschappen, Harlem. The only other American Foreign Member was J. D. Dana. (Number of Foreign Members limited to 60.) See also 1880.

Awarded the Huygen's medal by the Society which had "resolved to award biennially a medal to the individual who, by his researches and discoveries or inventions during the previous twenty years had, in the judgment of the Society, distinguished himself in an exceptional manner in a particular branch of science."

1878, May 20: Elected Honorary Member of the Cambridge [England] Philosophical Society.

1878, Aug.: Appointed by the National Academy of Sciences on a Committee to plan for surveying and mapping the territories of the United States. See also 1869.

1879–80: President of the Philosophical Society of Washington. See also 1871.

1879–80: Lecturer on Political Economy at Harvard University. (Four Lectures.) See also 1858.

1880, May 26: Delegate of the Hollandsche Maatschappy der Wetenschappen at the celebration of the 100th anniversary of the founding of the American Academy of Arts and Sciences at Boston. See also 1860, 1878.

1881: Elected Honorary Foreign Fellow (limited to 36) of the Royal Society of Edinburgh.

1881: Became an administrator of the Watson Fund on behalf of the National Academy and continued in active service in connection with it (chairman of the Board of Trustees from 1887) until his death. The fund was founded by the will of Professor J. C. Watson and it provided the means for support of research and investigation and the award of the Watson Gold Medal. See also 1869.

1881: Elected Home Secretary of the National Academy of Sciences; held the office till 1883. See also 1869.

1881: Appointed by the National Academy of Sciences chairman of a Committee on Questions of meteorological science and its applications. Committee discharged in 1884. See also 1869.

1881–82: Delivered twelve lectures at the Lowell Institute, Boston, on the "History of Astronomy."

1881, March 9: Elected Foreign Member of the Kungliga Fysiografiska Sällskapet (Royal Physiographical Society), Lund, Sweden.

1882: Sent by the U. S. government to Cape of Good Hope to observe the transit of Venus, Dec. 6. See also 1871.

1882, Mar. 16: Elected Honorary Member in the Section of Science of the Royal Irish Academy, Dublin. Such members are limited to 30, of whom one half at least must be foreigners.

1883: Elected Vice-president of the National Academy of Sciences. He continued in this office till 1889. See also 1869.

1883, June 7: Elected Corresponding Member of the Königliche Preussischen Akademie der Wissenschaften, Berlin. See also 1899.

1884: LL.D. Harvard University, Cambridge, Mass. In the diploma occur the words: "Simon Newcomb virum summo ingenio præditum Mathematicum acutissimum rerumque coelestium peritissimum." See also 1858.

1884: Appointed Member of the Board of Examiners of the International Electrical Exhibition of The Franklin Institute of the State of Pennsylvania. See below.

1884: Appointed Professor of Astronomy in the Corcoran Scientific School of Columbian (since 1904 George Washington) University. Resigned 1886. See also 1873.

1884, July 22: Appointed by President Arthur, Commissioner of the National Conference of Electricians at The Franklin Institute, Philadelphia. See above.

1884, Aug.: Elected Corresponding Member of the British Association for Advancement of Science. See also 1904.

1884, Oct.: Appointed Professor of Mathematics and Astronomy at Johns Hopkins University, and lectured there till Jan. 1, 1894. He was reappointed in 1898 and retained the position till 1900. See also below, 1897, 1899, 1900, 1901, 1902.

1884–94, 1899 and 1900: Editor-in-Chief of the *American Journal of Mathematics*, Johns Hopkins University. Associate Editor; 1878, 1879, 1895–98, 1901–1909. See also 1884.

1885: Elected the first President of the American Society for Psychical Research. Reelected President of the Society in 1886.

1885, June 18: Asked if he would accept the Presidency of the University of California.

1886: Ph.D., University of Heidelberg, Germany, on the celebration of the 500th anniversary of its founding. Degree conferred *in absentia*.

1886, Jan. 15: Elected Honorary Member (at the same time as Chrystal and Sylvester) of the Association for the Improvement of Geometrical Teaching, afterwards the Mathematical Association, London.

1886, Oct. 11: Elected Associate of the Liverpool Astronomical Society.

1886, Nov. 6: Elected President of the Alumni Association of the Lawrence Scientific School in Harvard University. See also 1858.

1887: President of the Political Economy Club of America.

1887: Elected one of the eight members of the Council of the Astronomische Gesellschaft, an international astronomical society that meets once in two years. See also 1873.

1887: The Russian Emperor orders his portrait to be painted and placed in the gallery of famous astronomers at the Imperial Observatory at Pulkovo. See also 1889.

1887, Jan. 4: Elected Member of the Anthropological Society, Washington, D. C.

1887, Apr. 13: LL.D., Columbia University, New York, on the occasion of the celebration of the "one hundredth anniversary of the Revival and Confirmation by the Legislature of the State of New York of the Royal Charter granted in 1754."

1887, Apr. 19: Elected Honorary Member of the Manchester Literary and Philosophical Society, Manchester, England.

1888: Imperial University of Tokyo, Japan, officially presents him with a pair of bronze vases of exquisite workmanship and design and great intrinsic value.

1888, Nov. 3: Elected Correspondent of the Königliche Gesellschaft der Wissenschaften, Göttingen. See also 1907.

1889: Presented with a rare vase of jasper on a pedestal of black marble, six and one half feet high, which, says Mr. Nyren's letter announcing the gift, "in recognition of these merits, His Majesty the Emperor has graciously sent as a present for you from the observatory at Pulkovo." An attached silver label has the following inscription: "A Monsieur le Professeur Simon Newcomb de la part de l'Observatoire Central Nicolas de Poulkovo 7/19 août, 1889." See also 1887.

1889, Sept.–Nov.: Foreign Associate of the Commission of Organization of the Congrès International de Chronométrie. (In connection with the World's Exposition, 1889.)

1890, June 4: Elected a Member of the American Academy of Political and Social Science, Philadelphia.

1890, Nov.: Awarded the Copley Medal by the Royal Society, London, for contributions to the progress of gravitational astronomy. Franklin was the first recipient of this medal, in 1753. The medal was accompanied by a cheque for £50. See also 1877.

1891, May 4: Elected Honorary Member (number restricted to 50) of the New York Academy of Sciences.

1891, May 4: One of the twenty-one eminent scientific men elected Honorary Members of the Royal Institution of Great Britain, on the celebration of the Faraday Centenary. Diploma presented by the Prince of Wales on June 17.

1891, Aug.: Elected Honorary Member of the Committee of Organization for the Fifth International Congress of Geologists, Washington.

1891, Aug. 1: LL.D., Edinburgh University, Scotland. This degree was first offered in connection with the celebration (April 17, 1884) of the 300th anniversary of the founding of the university, and finally conferred *in absentia*.

1891, Nov. 3: Elected Honorary Fellow (number limited to 15) of the Astronomical and Physical Society of Toronto, now the Royal Astronomical Society of Canada.

1891, Nov. 7: Elected a Member of the New York Mathematical Society. In 1894 this society became the American Mathematical Society. It was on Newcomb's suggestion (letter dated Jan. 29, 1891) that the *Bulletin of the New York Mathematical Society* (started October, 1891) was devoted to the interests of applied as well as of pure mathematics. See also 1896.

1891, Dec. 15: Elected Associate (number limited to 50) of L'Académie Royale des Sciences, des Lettres et des sciences morales et politiques et des Beaux Arts de Belgique, Brussels.

1892, July 6: Sc.D., Dublin University, Ireland, at the celebration of the tercentenary of its foundation.

1892, Dec. 7: Phil.Nat.D., University of Padua, Italy, on the occasion of the celebration of the 300th anniversary of the appointment of Galileo as a Professor. Degree conferred *in absentia*.

1894, May 29: Announced that "Aristides" (= S. Newcomb) was the winner of the first prize, $150, of two "Citizenship Prizes" offered in 1893 by the Anthropological Society of Washington for the best essay on a given topic and not over 3,000 words in length. The essay was entitled: "The Elements which make up the most useful citizens of the United States," and was published in the *American Anthropologist* for 1894.

1895–1903: Mathematical Editor of Science.

1895: Appointed a judge of Instruments of Precision at the Atlanta Exposition.

1895: Awarded the *Astronomical Journal* prize of

$400 for the "most thorough discussion of the theory of the rotation of the earth, with reference to the recently discovered variation of latitude."

1895, June 17: Elected one of the eight Foreign Associate Members of the Académie des Sciences de l'Institut de France, to succeed Helmholtz, the celebrated physiologist. It is said that Newcomb was the first native American since Franklin so honored. See also 1874.

1895, Aug. 1: Elected Foreign Associate of the Astronomical Section of the Reale Accademia dei Lincei, Rome. (Number of astronomers limited to 8.) See also 1906.

1895, Nov. 21: Appointed a Delegate on the part of the United States to the Conference, held in London, July, 1896, under the auspices of the Royal Society, to discuss the question of preparing, by international cooperation, an adequate catalogue of scientific literature. See also 1877.

1896: Elected an Honorary Member of the Inperatorskaja Akademija naük (Imperial Academy of Sciences), Petrograd. (Number limited to 50.) See also 1875.

1896, Jan. 4: Elected an Officer of the Legion of Honour of France. The grade of Officer, which is next above that of Chevalier, is limited to 4,000, mostly Frenchmen. Simon Newcomb was authorized by Congress to receive this decoration (see *Congressional Records*, March 3, 1897); for the Constitution of the United States provides (Art. 1, Sec. 9, Par. 7): "No title of nobility shall be granted by the United States; and no person holding any office of profit or trust under them shall, without the consent of Congress, accept of any present, emolument, office or title, of any kind whatever, from any king, prince or foreign state."

1896, May: Delegate to the Conference at Paris on the Astronomical Constants.

1896, June 15–16: Invited guest at celebration in Glasgow of Lord Kelvin's Jubilee.

1896, June 16: LL.D., Glasgow University, Glasgow.

1896, June 18: Sc.D., Cambridge University, England. In introducing Simon Newcomb, the public orator said that his distinction was owing to a great degree to his comparative researches in ancient lunar observations.

1896, Oct. 22: LL.D., Princeton University, Princeton, at the celebration of the sesqui-centenary of its foundation.

1896, Dec. 30: Elected President of the American Mathematical Society, New York, for two years. Delivered Presidential Address Dec. 29, 1897. See also 1891.

1897: Awarded the Schubert Prize (900 roubles = $460.80) by the Imperatorskaja Ajademija naük, Petrograd. This was the third time that the prize had been awarded. The award is made biennially for notable achievement in theoretical astronomy. The prize is the income from a foundation of 10,550 roubles in honor of F. F. Schubert, a general in the infantry and a former member of the Academy. See also 1875.

1897, Jan. 4: Elected a Member of the Columbia Historical Society of Washington, D. C.

1897, Feb. 12: Elected a Corresponding Member of the Imperatorskaja Russkoje Geografičeskoje obščestvo (Imperial Russian Geographical Society), Petrograd.

1897, Feb. 22: At the celebration of the 21st Anniversary of the founding of Johns Hopkins University, requested by the faculty and friends to sit for a portrait to be given to the University. This painting was executed by R. G. Hardie and was reproduced in the *American Journal of Mathematics* for 1899. See also 1884.

1897, Mar. 1: Elected a Foreign Associate of Società Italiana delle Scienze (detta dei XL.) Rome. The society has 40 Italian and 12 Foreign Associate members in the Class of Physics-Mathematics. He was the only American in the class. See also 1902, 1906.

1897, March 12: Placed on the retired list of the U. S. Navy by reason of age and therefore ceased to be Superintendent of the American Ephemeris and Nautical Almanac. See also 1857.

1897, June 30: Elected Honorary Corresponding Member of the Royal Society for the Encouragement of Arts, Manufactures and Commerce (commonly called the Royal Society of Arts), London.

1897, Nov. 27: The first recipient of the Bruce Gold Medal, from the Astronomical Society of the Pacific. In 1897, Miss Bruce gave to this Society "a sum of money for the foundation of a gold medal, to be awarded annually as a recognition of services to astronomy, and to be given to the one judged most worthy, without restriction as to race, nationality or sex. No person shall be twice a recipient." In 1891, Miss Bruce gave Professor Pickering $6,000, to be distributed for the promotion of astronomical research. A portion of this amount was assigned to Professor Newcomb.

1898: Cape Newcomb of the Hoyt Islands, Hubbard Bay, West Greenland, is named after

Simon Newcomb. (See *National Geographic Magazine,* Volume 9, page 3.)

1898–99: Appointed by the Board of Overseers of Harvard College, a member of the Committee to visit the Observatory. See also 1858.

1898, Feb. 27: Elected Foreign Associate of the Reale Istituto Veneto di Scienze, Lettre ed Arti, Venice.

1898, Mar. 16: Elected Honorary Member of the Colonial Society of Massachusetts. (One of nine Honorary Members.)

1898, Apr. 23: Elected Honorary Member of the mathematics-natural science section of the Koninklijke Academie van Wetenschappen, Amsterdam. (Number limited to 20.)

1899, April: Appointed by Johns Hopkins University, Baltimore, as Delegate to the Jubilee celebration of Sir George G. Stokes at Cambridge, England, June 1–2. See also 1884.

1899, June 8: D.C.L., Oxford University, England.

1899, June 22: Elected Associate Corresponding Member of the Reale Istituto Lombardo di Scienze e Lettere, Milan.

1899, July 3: Elected Foreign Correspondent of the Bureau des Longitudes, Paris. Number limited to 10.

1899, Sept. 8: Elected the first President of the Astronomical and Astrophysical Society of America. The Society was organized at the third conference of Astronomers and Astrophysicists held at the Yerkes Observatory in accordance with arrangements made by a committee (of which S. Newcomb was chairman) appointed at the second conference held at Harvard Observatory in August, 1898. S. Newcomb was president of the society for six consecutive years.

1899, Oct. 9–10: Delegate from National Academy of Sciences to a conference at Wiesbaden (called by the Königliche Preussischen Akademie der Wissenschaften, Berlin) for the purpose of organizing an international association of learned societies. See also 1883.

1900, June 11: LL.D., University of Cracow, Austria, on the celebration of the 500th anniversary of its foundation. Degree conferred *in absentia.*

1900, Nov. 7: "With grateful recognition of the valuable counsel you have given to this university since its organization, the academic council has unanimously recommended to the Trustees that you be appointed Emeritus Professor of Mathematics [at Johns Hopkins University] and the Board of Trustees with like unanimity approved this recommendation." See also 1884.

1901, Feb. 22: One of the two to receive the first award of the Sylvester Prize of Johns Hopkins University. The prize was a handsome bronze medallion of the late Professor Sylvester, framed in oak. It was inscribed: "To Simon Newcomb, U. S. N., LL.D., Professor of Mathematics and Astronomy in the Johns Hopkins University, 1884–1900. In recognition of his distinction and his service." In the course of the ceremonies, President Gilman announced the award as follows: "The first impression of this tablet is presented to Lord Kelvin, who lectured here on 'The Nature of Light,' in 1884. . . . The second copy of the tablet is now offered to Professor Simon Newcomb, a distinguished astronomer, who has been a friend of the University from its inception, and who guided the affairs of the Mathematical Department for many years." See also 1884.

1901, Oct.: Elected Honorary Member of the Heidelberg Literary Society, Heidelberg University, Tiffin, Ohio.

1901, Oct. 8/21: Elected Honorary Member of the Russkoje Astronomičeskoje obščestvo, Petrograd.

1901, Nov. 6: Elected Honorary Member of the Royal Society of New South Wales, Sydney, Australia.

1902, Feb. 21: LL.D., Johns Hopkins University, at the celebration of the twenty-fifth anniversary of the founding. "In recognition of his pre-eminent attainments and important discoveries in science." See also 1884.

1902, Feb. 26: Guest at a banquet, given by eminent citizens of New York, in honor of H. R. H. Prince Henry of Prussia. He was one of the 94 participants chosen as "Captains of Industry" in the United States.

1902, Apr. 14: Elected Honorary Member of the Sociedad Astronomica de Mexico.

1902, June 1: Presented to King Vittorio Emanuele III. of Italy just after a meeting of the Reale Accademia dei Lincei. See also 1897.

1902, Sept. 6: Math.D., University of Christiania, Norway, in connection with the celebration of the Centenary of the birth of Niels Henrik Abel. Professor Newcomb went as delegate from the National Academy of Sciences. During the celebration he was presented to King Oscar of Sweden and Norway. See also 1869.

1903: Appointed by the Trustees, one of five members of the Advisory Committee in Astronomy of the Carnegie Institution of Washington. In 1903, Professor Newcomb received a grant of $3,000, and in 1904 a grant of $2,500, in 1905, $7,500, in 1906, $5,000, in 1907, $5,000 and in 1908, $5,000, from this Institution for expenses in connection with his investigations.

1903: Elected Foreign Secretary of the National Academy of Sciences. Held the office till his death. See also 1869.

1903: Appointed delegate to represent the National Academy of Sciences at the meeting of the International Association of Academies, which occurred in London, June 4, 1903. See also 1869.

1903, Feb. 26: Requested to send a letter to be read at the celebration of the twenty-fifth anniversary of the death of Fra Angelo Secchi, S.J., at Rome, Italy.

1903, Apr.: By the American Philosophical Society appointed a Member (one of 26) of a Committee to organize the Bicentenary Celebration of Franklin's birth. See also 1878.

1903–04: President of the International Congress of Arts and Sciences, Louisiana Purchase Exposition, which met at St. Louis, September 19–25, 1904. He received a diploma "for distinguished services in promoting" the Congress. As President of the Congress he was delegated to visit France and England to invite scientists of these countries to participate in the Congress. On March 29 he gave a dinner at Paris, for a number of French scientists. He was presented to President Loubet of France about this time. See also 1906.

1903, June: Presented to King Edward VII. of England.

1904: One of the Vice-presidents of the Mathematics and Physics Section of the British Association for the Advancement of Science. See also 1884.

1904, May 20: Elected Corresponding Member of the Kaiserliche Akademie der Wissenschaften, Vienna. (Limited to 80 members.)

1904, June: LL.D., University of Toronto. The Senate of the University voted on June 6, 1900, to confer the degree, but it was not till 1904 that Professor Newcomb could attend a convocation to receive it.

1905, March 5: Elected Corresponding Member of the Reale Accademia della Scienze, Turin.

1905, March 11: Invited by Senator Baron d'Estournelles de Constant, Paris, to be one of the "Membres d'Honneur" of the Comité de Défense des Intérêts Nationaux et de Conciliation Internationale" of which the Baron was Président Fondateur.

1905, Apr. 28: Elected Corresponding Member of L'Institut National Génevois, Geneva.

1905, Nov. 8: By the German Emperor made Knight of the Prussian Order "Pour le Mérite für Wissenschaften und Künste." The Order of Merit is composed of two classes, military and civil. The first class was founded by Frederick the Great in 1740. The second class founded by Frederick William IV., in 1842, for distinction in Science and Art has always been very highly prized. It is the only decoration which Thomas Carlyle would ever accept. Knighthood in this order is limited to 30 Germans and a not larger number of foreigners. At the time of Simon Newcomb's election there were about 20 foreign Knights. The bill granting permission to Newcomb to accept this decoration became law on April 6, 1906.[2] Compare 1896.

1906–07: President of the Cosmos Club, Washington, D. C.

1906, Apr. 17–20: Delegate at the Bicentenary Celebration of Benjamin Franklin's Birth, at Philadelphia, from: (1) Reale Accademia di Scienze, Lettere ed Arti, Padua; (2) Reale Accademia dei Lincei, Rome; (3) L'Académie des Sciences de l'Institut de France, Paris; (4) Società Italiana delle Scienze, Rome. Recipient of one of the Franklin Bronze Medals struck in accordance with an Act of Congress approved April 27, 1904. See also 1874, 1878, 1895, 1897, 1903, below.

1906, June 27: Elected a Member of the Board of Overseers of Harvard University, for 6 years. Simon Newcomb was the first graduate of the Lawrence Scientific School, not already a graduate of the College, who was elected to this body. See also 1858.

1906, June 30: Elected Honorary Member of the Reale Accademia di Scienze, Lettere ed Arti, Padua. See also above.

1906, June 30: Commissioned Rear-Admiral when Congress authorized the President to make promotions of officers who had served in the Civil War and who had been discriminated against by previous laws. See also 1877.

1906, Sept. 25: At the quatercentenary celebration of the founding of the University of Aberdeen, Scotland, on this date various honorary degrees were conferred. Professor Newcomb was invited to be present to receive the degree of LL.D., but he was unable to accept the invitation.

1906, Dec. 8: Bronze plaque sent from Berlin and addressed to "Dr. Simon Newcomb, St. Louis" by Th. Lewald, "Der Reichskommissar für die Weltausstellung in St. Louis, 1904," who wrote: "In commemoration of Germany's participation

[2] On the death of a Knight it is required that the decoration be returned to the German government.

in the International Exposition at St. Louis, 1904, I have had a plaque prepared which forms a lasting memento of the cordial and pleasant relations which prevailed there. I take the liberty of forwarding for your acceptance a specimen with your name engraved on it.'' The plaque is inscribed on one side ''Simon Newcomb, Arta Artis Vincula'' and in small letters ''Peter Breuer,'' and on the other side: ''Zur Erinnerung an Deutschlands Beteiligung an der Weltausstellung in St. Louis, MCMIV.'' See also 1903–04.

1907, Jan. 5: Made Commandeur de l'Ordre National de la Légion d'Honneur, France. A bill granting permission to accept this decoration was deemed unnecessary in view of the permission already given to accept the rank of Officer of the Légion d'Honneur.

1907, Feb. 8: Elected one of the 12 Honorary Fellows of the Physical Society, London.

1907, March 22: Elected a Foreign Member of the mathematics-natural science class of the Videnskabs Selskabet (Society of Sciences), Christiania. (Number limited to 100.)

1907, June 3: Elected Honorary Member of the Société Scientifique ''Antonio Alzate,'' Mexico.

1907, July: Lecturer at the Summer School of the University of California.

1907, July 20: Elected Foreign Member of the Königliche Gesellschaft der Wissenschaften, Göttingen. Election royally confirmed Oct. 4. See also 1888.

1908, April 6–11: One of the 11 Vice-presidents and one of the 9 principal speakers of the Fourth International Congress of Mathematicians held at Rome, Italy. He was the only American on the International Committee (61 members) for organization of the Congress. He was also a Delegate from the Smithsonian Institution and the American Philosophical Society. See also 1879.

1908, Aug.: Delegate from the National Geographic Society at Washington to the International Congress of Geography at Geneva, Switzerland.

1908, Aug. 17: Received in audience by Emperor William II. at Wilhelmshöhe, Germany, and lunched with his Majesty and the Empress.

1908, Nov. 13: Appointed one of the Committee of 19 on the ''Charles William Eliot Fund.''

1908, Dec. 19: Elected President of the Philosophical Society of Washington. See also 1871.

1909, Jan. 1: Elected Vice-president of the American Philosophical Society, Philadelphia, Pa. See also 1878.

1910, July: At this time the two bronze doors for the West Entrance of the U. S. Capitol, designed and modeled by Professor Louis Amateis, of Washington, were cast in New York. In the Science panel of one of the doors is a medallion of Newcomb. At present the doors are in the north vestibule of the National Museum, new building.

Died at Washington, D. C., July 11, 1909

R. C. Archibald

THE BIOLOGY OF THE MALAYAN ISLANDS[1]

There are not many biologists who have not read with absorbing interest, the account by Wallace of his experiences in the Malayan countries, and his conclusions therefrom. Likewise, there are but few biologists unfamiliar with the story of Beccari's experiences in Borneo, or with the account of d'Albertis's expedition to the Fly River. Probably no similar area of land surface has ever yielded, on superficial examination, such a wealth of unique living organisms and striking biological problems. We have reason to know that all of the early work in these regions has been in the nature of pioneer reconnaisance—the breaking of trails—and that the field as a whole is to-day as near a virgin field as any remaining on earth.

It is doubtful if the geography of any other similarly extensive region of earth is so unfamiliar to Americans as that of the Malay Peninsula Region, and the Malay Archipelago. When we speak of the Sunda Group, the Moluccas, or even the large and important Islands of Celebes, Gilolo, Ceram, or Bouru, Americans commonly have but dim idea of their location. And how many Americans know the difference between Macassar and Malacca, or Sulu and Sula? Yet this whole region, including the Philippines, extends from 2 degrees north to 10 degrees south, for a distance of some 2,300 miles, and more than 2,000 miles from east to west. Its northernmost limit falls in the latitude of Mexico City, Santiago de Cuba and Bombay. Its southernmost limit falls in the latitude of Central

[1] Letter addressed to Dr. David Starr Jordan.

Peru and the northern extension of Australia. Some of its most important islands and groups represent very large extents of land surface. Indeed, the whole region, taken together, is considerably more than a fourth of the entire area of the United States. Sumatra is larger than Kansas and Nebraska together by some 20,000 square miles. Borneo is about as large as California and the New England states together. Celebes is twice the size of Illinois. Ceram is larger than the entire Hawaiian group taken together. The magnificent Island of New Guinea is larger than Texas and Louisiana together, and vastly more varied in topography and conditions than either of these states. The great Philippine group of above a thousand islands, comprises a land area of more than 127,000 square miles, scattered through 15 degrees of latitude.

A large part of this entire area is covered with dense tropical forests, but there are also considerable areas of mangrove swamps, upland meadows, and partially arid districts, the whole threaded with numerous streams and with occasional lakes. As a general thing, these countries are very mountainous, many of the mountains reaching into high altitudes, and carrying faunæ and floræ of extraordinary interest. In New Guinea some of the mountains are snow-capped. Extensive evidences of volcanic action, both ancient and recent, are commonly visible, though extensive outcrops of metamorphic rocks occur in most of the groups.

Many of the most interesting of the islands of this region are, biologically speaking, practically terræ incognitæ, having been touched, if at all, only at isolated points, by travelers or expeditions. It is a common experience in the Philippines—even after fifteen years of American occupation—to find important groups of living organisms richly represented, which have never been previously recorded as existing here at all. It is not difficult to enter the more extensive forests at almost any point and stumble upon magnificent forest trees that are wholly unknown to science. The more inconspicuous groups among plants, as for instance the fungi, have been scarcely touched, though, so far as they have been examined, they show a remarkable proportion of new and unique forms. In many groups of insects of the greatest biological and economic importance, we find here a vast fauna, most of the species of which are yet unknown to science. For instance, so far as known to me, only two species of Aphididæ have ever been recorded from the Philippines, and only two species of Thysanoptera, whereas we possess an astonishing display in these two groups. During my first year at Los Baños, I brought together at this one point a far greater number of species of the important family Ichneumonidæ than had previously been described from the entire Malayan region, including Java, Sumatra, the Peninsula, and New Guinea. In three years, at this one point, I have also far exceeded in many universally distributed groups, the number of species reported for entire British India. In certain groups with which I am specially familiar, it is very evident that a knowledge of the Malayan fauna will completely modify our ideas of the comparative anatomy and taxonomy of these groups for the world.

To illustrate what might be very rapidly accomplished here, I may say that during three years, with but scant time myself for field work, but by the use of a Cuban boy whom I have trained for this work through eleven years, and a few Filipino students, I have been enabled to get together very extensive collections of fungi in this locality, which have been occupying a large amount of attention from half a dozen of the world's best mycologists, producing a succession of papers of the highest importance, and making known to science a very large number of remarkable fungus types, including the causative organisms of a very considerable number of important plant diseases. Similarly, these activities—mostly in this immediate locality—in connection with the insects, have produced a mass of valuable materials that is now occupying a large part of the time of above thirty well-known entomological specialists throughout the world. This has been done wholly extra-officially, and at my own personal ex-

pense. If this be possible in so short a time with practically no outside support, what splendid things might not be possible with a little organization and support. After wide experience, running through twenty-four years, I do not, as a general thing, believe in expeditions. The results to be obtained therefrom rarely justify the great expense, and do not compare either in quantity or quality with residence. In these countries we have had resident biologists only in Singapore, Java, Amboina, Sarawak and Luzon—that is, biologists engaged on the fauna and flora. Among other things, continued residence would enable us to make more extensive collections of seeds and living plants than have ever been made in these regions before, and American botanic gardens and American botanists could profit largely through such activities. Recently a single Sunday jaunt made near here produced a fine new *Gardenia,* a new *Pavetta,* several recently described palms, some new Hepaticæ and mosses, and a large number of new fungi.

It seems to me that this is a tremendous opportunity for American institutions or for American scientific societies. I believe that funds for work of this character could be expended here with more highly interesting and important results in proportion to the amount expended, than in almost any of the lesser known regions of the earth. I recommend most strongly that this be accomplished through *residence,* in periods of not less than two or three years for any given region. This would involve something of the nature of a moving laboratory. Good houses can be built very cheaply in these countries, and temporary locations can be obtained with great readiness, and without expense, at almost any point. There are a number of men, including myself, who are ready and anxious to take part in this work, and to whom salary or separation from home and the larger centers are entirely minor considerations. The station or stations maintained would ever be ready as headquarters for students who were engaged in advanced investigations and who might come out for varying lengths of time, assured of finding here a safe and comfortable base for operations in the most favorable regions. There has been a great deal of economic development in these countries since the days of Wallace and Beccari. Steamship lines now reach many points among these islands, and planters have established themselves in many places near the coasts, so that travelling is no longer either difficult or unsafe.

I would suggest that the first station be established in the very large but almost unknown island of Mindanao, the largest of the Philippines, and the interior of which has been rarely even visited by biologists. With an accompanying or succeeding station in British North Borneo, and later in Celebes and the more southern islands, it will be possible to make a more thorough study of island faunæ, as opened up by Wallace, than has ever before been possible in Malayan regions. Results of the highest importance are likely to follow both among plants and insects. A recent collection of Luzon Elateridæ sent by me to Fleutiaux, besides containing many endemic forms, has been shown to include many species formerly supposed to be confined to Borneo, Celebes, Amboina, and even Sumatra. More thorough and comprehensive work promises to completely revise our ideas of the distribution of certain groups through the Malayan Islands. Of even greater importance is the fact that beyond the few highly interesting observations of Wallace and some others, we know nothing of the life relations of the vast series of insects and plants inhabiting this region. This can be tapped effectively only by *residence.* My friend, Mr. Frederick Muir, expert entomologist, of Hawaii, now here with me, who has travelled widely in the Orient, concurs with me, in the belief that the proposed stations would be of the highest possible value in connection with the work in insect parasites which is playing so large a part in the economic entomology of to-day.

It would be necessary to fix some point or points in America as general depositories for the safe preservation and continued study of the materials gathered in connection with this

work. As an initial contribution, I would be glad to deposit now, under certain conditions, some 10,000 herbarium specimens, including cotypes of a large number of new species, and several hundred thousands of specimens of insects, including a large number of types as well as cotypes. Even this contribution alone it would be a pity for America to lose.

I can not, in the limits of a single letter, of this nature, present this matter in all of its more important phases. I believe that it merits your most active interest, and I hope that you will give it the most careful consideration, and then champion it, in so far as it may be possible or feasible for you. Especially, I wish that you would bring it to the attention of any others who would be likely to be interested in the matter, and also, where possible, bring it to the attention of museums, societies, or public institutions, which would be likely to consider taking an active interest in the promotion of this work. I believe that American biology greatly needs the assistance, the light, and the modifying influence that would result from active interest in one of the greatest and most important of the faunæ and floræ of the Orient.

C. F. BAKER

LOS BAÑOS, PHILIPPINES

THE PRESENTATION OF THE JOHN FRITZ MEDAL TO ELIHU THOMSON[1]

IT is a pleasure to take part in this tribute of respect to Professor Thomson not merely because of my association with him in the management of the affairs of the Massachusetts Institute of Technology, and the high personal regard that association with such a man entails, but because I realize that he is an educational force of great potency and that it is in the very highest interests of education that his merits should be widely appreciated and at least occasionally acclaimed. In view of what those who have preceded me have said, it must be unnecessary, especially to such an audience as this, to review in detail his remarkable career. All who know anything of the subject know that in the field of electrical engineering his work has been most brilliant and that his contributions to the development of the great science on which so much of our modern conveniences depend will easily bear comparison with those of any man now living. To the public at large this will seem an exaggeration, but the public has little sense of values where such achievements as Professor Thomson's are concerned, and in this case it is handicapped in arriving at the truth through Mr. Thomson's deliberate unwillingness, I might perhaps say his utter incapacity, to advertise himself in the slightest degree.

Much nonsense has been spoken and written about the merits of national expositions, and amongst the statements that might fairly be placed in this class is one to the effect that it was the Paris Exposition of 1878 that *made* Thomson an inventor. It has been forces within Professor Thomson far more than forces outside that have contributed to his great success. He was twenty-five years of age at the time of the Paris Exposition and had already received a sound scientific training and earned distinction in his chosen field. Doubtless his visit to the Exposition stimulated his imagination and gave an incentive to his work, but it can hardly have made him an inventor. Be that as it may, it was not long thereafter that he became a marked man, through his notable contributions to science and its industrial applications. His earliest inventions comprised a comprehensive system for electric arc lighting and I have been told that in those pioneer days his arc-light dynamo was described by a German as "an American machine that violates every known law of the electrical art." This indicates how far Thomson was in advance of his day and on what insecure foundation the electrical art of the time was resting, for the same learned German had to admit that the machine was the most effective and successful dynamo on the market. This was only the beginning of a long series of triumphs that have led, it is said, to over five hundred patents, a large number of them embodying underlying principles so wide in their application that they might almost be classed

[1] Massachusetts Institute of Technology, December 8, 1916.

as physical laws. Amongst his conspicuous achievements is his invention of electric welding about 1880, one of the great inventions of the last generation, and one whose far-reaching importance is not yet fully appreciated. His early lightning arrestors disclosed the magnetic means of blowing out an electric arc which has remained to this day an important feature of many electrical devices. His watt-hour meters are still in use for measuring the current delivered by electric companies to their customers, although the first patents thereon were granted a generation ago. Among his many other notable inventions are his constant-current transformer, his high-frequency transformer, his alternating-current repulsion motor and his automatic regulator for constant-current dynamos.

It is certain, however, that no mere enumeration of inventions suffices as a measure of the man. It does not even suggest the whole story on its strictly scientific side. Many men come to an end of their rope when they have made a specific invention. It is only a few who can correlate a series of inventions into an organized machine that will be effective and economical, and among such men Thomson is transcendant. Apart from this, however, as with all scientists of similar quality, the man is far more than the inventor. It would be an impertinence on my part to give you the full measure of the man, but perhaps I may be permitted in the few minutes that are left to me to touch on one or two aspects of his personality that are indicative of qualities making powerfully for his own success and contributing largely to his stimulating influence on others.

Much has happened in recent years to awaken the world to an appreciation of the fact that industrial improvement and national well-being depend very largely on the progress of science. Consequently, more attention is being given now than ever before to the problems of the schools of applied science. One of the greatest of the problems that confront these schools is the problem of finding adequate means of encouraging the spirit of scientific research. We must, of course, do this through our teachers and the fundamental problem is to find and to attract men who combine two rare qualities, first, the power of extending the boundaries of knowledge and, second, the power of stimulating others to equally effective endeavor. Thomson, had he continued in the schools, would have made the ideal teacher in this respect. He did not so remain, but it is fitting, I think, that people still insist on calling him "Professor." This is a reminder of the fact that he has been and is a great teacher in the sense that I have indicated, although happily his influence has not been confined to any single school. Throughout his life he has not only done great things himself, but shown an intense desire to help all who are struggling earnestly with a scientific problem. He has proved an inspiration to an ever widening circle of engineers and others who have entrusted him with their secrets and sought his help in overcoming their difficulties. They have done this knowing that they had only to ask in order to get the full benefit of his imagination and his power, and that they need have no misgivings that he would take any advantage of their confidence or any credit for their work, for he has no touch of selfishness. That is a great and rare thing in itself, but, of course, there are many other factors that have contributed to the making of the man. Perhaps not the least of these has been his all-roundedness as a man of science. In these days of increasing specialization men's vision is often narrower rather than wider as they advance in years. Thomson so far as his interests are concerned has taken the whole field of scientific development for his parish, not, of course, that he cultivated the whole field; but he has an intelligent interest in and an extraordinarily wide knowledge of what is going on in almost every portion of that field. Doubtless, this has helped him tremendously even in the narrowest region of a particular specialty. Another great aid to his success has been his thorough appreciation of scientific method. There has never been anything haphazard about his processes, although those that do not understand have sometimes said that men like Thomson do things "by instinct." What this really means is that such

men have thought so long and so effectively on the problems in which they are interested and have observed so accurately that an understanding of the fundamental phenomena has become part of their very being. Their instinct is like the instinct of an experienced helmsman, the result of long training and practise. It has sometimes seemed to me that not the least significant fact in regard to Professor Thomson's work is the fact, known to those who have had the pleasure of seeing him in his home, that his laboratory is built right into the home and is an integral part of it. Probably thoughts on scientific problems are never wholly absent from his mind, although he may be consciously thinking of quite other matters. It can hardly be necessary to say that a man who has achieved what Thomson has done must be more than I have pictured, an unselfish, generous, well-trained, well-rounded, well-balanced man of science. Above all and pervading all must be imagination, not necessarily the imagination of a poet, but something akin to that in quality and in power, and it is of course mainly because Thomson is a man of imagination in the highest sense that he has achieved so much success and earned so much respect not only in this country, but throughout the scientific world. He has been literally showered with honors and it must be almost a unique thing to obtain two great national medals within almost a week, one from the Royal Society of London, and the other the great honor of the Fritz medal that is now to be awarded. I heartily congratulate the board of award on having found a man worthy to be placed beside the greatest whose names have already given distinction to their selections, like Graham Bell, Edison and Kelvin. Such a one undoubtedly is Elihu Thomson. Long may he be preserved to us.

RICHARD C. MACLAURIN
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

THE CONVOCATION-WEEK MEETINGS OF SCIENTIFIC SOCIETIES

THE American Association for the Advancement of Science and the national scientific societies named below will meet at New York City, during convocation week, beginning on Tuesday, December 26, 1916:

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.—President, Charles R. Van Hise, president of the University of Wisconsin; retiring president, Dr. W. W. Campbell, director of the Lick Observatory; permanent secretary, Dr. L. O. Howard, Smithsonian Institution, Washington, D. C.; general secretary, Professor W. E. Henderson, Ohio State University; secretary of the council, Dr. C. Stuart Gager, Brooklyn Botanical Garden.

Section A—Mathematics and Astronomy.—Vice-president, Professor L. P. Eisenhart, Princeton University; secretary, F. R. Moulton, University of Chicago, Chicago, Ill.

Section B—Physics.—Vice-president, Professor H. A. Bumstead, Yale University; secretary, Dr. W. J. Humphreys, U. S. Weather Bureau, Washington, D. C.

Section C—Chemistry.—Vice-president, Professor Julius Stieglitz, University of Chicago; secretary, Dr. John Johnston, Geophysical Laboratory, Washington, D. C.

Section D—Mechanical Science and Engineering.—Vice-president, Dr. H. M. Howe, Columbia University; secretary, Professor Arthur H. Blanchard, Columbia University, New York City.

Section E—Geology and Geography.—Vice-president, Professor R. D. Salisbury, University of Chicago; secretary, Professor George F. Kay, University of Iowa.

Section F—Zoology.—Vice-president, Professor G. H. Parker, Harvard University; secretary, Professor Herbert V. Neal, Tufts College, Mass.

Section G—Botany.—Vice-president, Dr. C. Stuart Gager, Brooklyn Botanical Garden; secretary, Dr. A. F. Blakeslee, Cold Spring Harbor, N. Y.

Section H—Anthropology and Psychology.—Vice-president, Dr. F. W. Hodge, Bureau of American Ethnology; secretary, Professor George Grant MacCurdy, Yale University, New Haven, Conn.

Section I—Social and Economic Science.—Vice-president, Louis F. Dublin, Metropolitan Life Insurance Company; secretary, Seymour C. Loomis, 69 Church Street, New Haven, Conn.

Section K—Physiology and Experimental Medicine.—Vice-president, Professor Edwin O. Jordan, University of Chicago; secretary, Professor C.-E. A. Winslow, Yale University.

Section L—Education.—Vice-president, Dr. L. P. Ayres, The Russell Sage Foundation; secretary, Dr. Stuart A. Courtis, Detroit, Mich.

Section M—Agriculture.—Vice-president, Dr. W. H. Jordan, director of the New York Agricultural Experiment Station; secretary, Dr. E. W. Allen, U. S. Department of Agriculture, Washington, D. C.

American Mathematical Society.—December 27 and 28. President, Professor Ernest W. Brown, Yale University; secretary, Professor F. N. Cole, 501 West 116th St., New York, N. Y.

Mathematical Association of America.—December 28, 29 and 30. President, Professor E. R. Hedrick, University of Missouri; secretary, W. D. Cairns, 5465 Greenwood Ave., Chicago, Ill.

American Astronomical Society.—December 26 to 30. President, Dr. E. C. Pickering, Harvard College Observatory; secretary, Dr. Philip Fox, Dearborn Observatory, Evanston, Ill.

American Federation of Teachers of the Mathematical and the Natural Sciences.—Council meeting. Secretary, W. A. Hedrick, Central High School, Washington, D. C.

American Physical Society.—December 26 to 30. President, Professor R. A. Millikan, University of Chicago; secretary, Professor Alfred D. Cole, Ohio State University, Columbus, Ohio.

Optical Society of America.—December 28. President, Dr. Perley G. Nutting, 3 Kodak Park, Rochester, N. Y.

American Chemical Society.—President, Dr. Charles H. Herty, New York City; secretary, Dr. C. L. Parsons, U. S. Bureau of Mines, Washington, D. C.

American Electrochemical Society.—Chairman, New York Section, Dr. Colin G. Fink, Edison Lamp Works, Harrison, N. J.

Society for the Promotion of Engineering Education.—President, Professor H. S. Jacoby, Columbia University; secretary, Professor F. L. Bishop, University of Pittsburgh, Pittsburgh, Pa.

Illuminating Engineering Society.—President, W. J. Serrill; chairman, Committee on Reciprocal Relations, Clarence L. Law, Irving Place and 15th St., New York, N. Y.

Association of American Geographers.—December 28 to 30. President, Dr. Mark Jefferson, Michigan State Normal College, Ypsilanti, Mich.; secretary, Professor Isaiah Bowman, Yale University, New Haven, Conn.

American Alpine Club.—December 30. President, H. G. Bryant; secretary, Howard Palmer, New London, Conn.

American Society of Naturalists.—December 29. President, Dr. Raymond Pearl, Maine Agricultural Experiment Station; secretary, Professor Bradley M. Davis, University of Pennsylvania, Philadelphia, Pa.

American Society of Zoologists.—December 27, 28 and 29. President, Professor D. H. Tennent, Bryn Mawr College; secretary, Professor Caswell Grave, Johns Hopkins University, Baltimore, Md.

Entomological Society of America.—December 26 and 27. President, Dr. E. P. Felt; secretary, J. M. Aldrich, West Lafayette, Ind.

American Association of Economic Entomologists.—December 28, 29 and 30. President, Dr. C. Gordon Hewitt, Department of Agriculture, Ottawa, Canada; secretary, Albert F. Burgess, Melrose Highlands, Mass.

American Genetic Association.—December 26, 27 and 28. President, David Fairchild, U. S. Department of Agriculture; secretary, George M. Rommel, 511 11th St., Washington, D. C.

Eugenics Research Association.—President, Professor Adolf Meyer, The Johns Hopkins University; secretary, William F. Blades, 191 Haven Ave., New York, N. Y.

Ecological Society of America.—December 27, 28 and 29. President, Professor V. E. Shelford, University of Illinois; secretary, Forrest Shreve, Desert Botanical Laboratory, Tucson, Ariz.

Botanical Society of America.—December 27 to 30. President, Professor R. A. Harper, Columbia University; secretary, Dr. H. H. Bartlett, University of Michigan, Ann Arbor, Mich.

American Phytopathological Society.—December 27 to 30. President, Dr. Erwin F. Smith, U. S. Department of Agriculture; secretary, Dr. C. L. Shear, U. S. Department of Agriculture, Washington, D. C.

American Fern Society.—December 29. President, Dr. C. H. Bissell, Michigan Agricultural College; secretary, C. A. Weatherby, 920 Main St., East Hartford, Conn.

Sullivant Moss Society.—December 29. President, Mrs. Elizabeth G. Britton, N. Y. Botanical Garden; secretary, Edward B. Chamberlain, 18 West 89th St., New York, N. Y.

Society of Horticultural Science.—December 28, 29. Secretary, C. P. Close, U. S. Department of Agriculture, Washington, D. C.

ASSOCIATION OF OFFICIAL SEED ANALYSTS.—Will meet on dates to be announced. Secretary, John P. Helyar, New Brunswick, N. J.

SOCIETY OF AMERICAN FORESTERS.—Meets on Friday, December 29. President, Dr. B. E. Fernow, University of Toronto; secretary, C. R. Tillotson, U. S. Forest Service, Washington, D. C.

MID-WEST FORESTRY ASSOCIATION.—President, Fred W. Smith, State School of Forestry, Bottineau, N. Dak.

AMERICAN MICROSCOPICAL SOCIETY.—Business sessions. President, Professor M. F. Guyer, University of Wisconsin; secretary, Professor T. W. Galloway, Beloit College, Beloit, Wis.

AMERICAN ANTHROPOLOGICAL ASSOCIATION.—December 26 to 29. President, Dr. F. W. Hodge, Bureau of American Ethnology; secretary, Professor George G. MacCurdy, Yale University Museum, New Haven, Conn.

AMERICAN FOLK-LORE SOCIETY.—December 27. President, Dr. R. H. Lowie, American Museum of Natural History; secretary, Charles Peabody, Harvard University, Cambridge, Mass.

AMERICAN PSYCHOLOGICAL ASSOCIATION.—December 27 to 30. President, Professor Raymond Dodge, Wesleyan University; secretary, Professor R. M. Ogden, Cornell University, Ithaca, N. Y.

AMERICAN PHILOSOPHICAL ASSOCIATION.—December 27, 28 and 29. President, Professor A. O. Lovejoy, The Johns Hopkins University; secretary, Professor E. G. Spaulding, Princeton University, Princeton, N. J.

AMERICAN SOCIETY OF BACTERIOLOGISTS.—December 29. Secretary, A. P. Hitchens, Glen Olden, Pa.

AMERICAN ASSOCIATION OF ANATOMISTS.—December 27, 28 and 29. President, Dr. H. H. Donaldson, Wistar Institute of Anatomy; secretary, Professor C. R. Stockard, Cornell Medical School, New York, N. Y.

AMERICAN PHYSIOLOGICAL SOCIETY.—December 27, 28, 29 and 30. President, Professor W. B. Cannon, Harvard Medical School; secretary, Professor Charles W. Greene, University of Missouri, Columbia, Mo.

AMERICAN SOCIETY OF BIOLOGICAL CHEMISTS.—December 27, 28 and 29. President, Professor Walter Jones, The Johns Hopkins University; secretary, Dr. Stanley R. Benedict, Cornell Medical College, New York, N. Y.

AMERICAN SOCIETY FOR PHARMACOLOGY AND EXPERIMENTAL THERAPEUTICS.—December 28, 29 and 30. President, Professor Reid Hunt, Harvard Medical School; secretary, Dr. John Auer, Rockefeller Institute, New York, N. Y.

AMERICAN SOCIETY FOR EXPERIMENTAL PATHOLOGY.—December 28, 29 and 30. President, Simon Flexner, The Rockefeller Institute; secretary, Dr. Peyton Rous, Rockefeller Institute, New York, N. Y.

(*The above four societies compose the Federation of American Societies for Experimental Biology. Executive Secretary, Dr. Peyton Rous.*)

AMERICAN NATURE-STUDY SOCIETY.—December 27. President, Professor L. H. Bailey, Ithaca, N. Y.; secretary, E. R. Downing, University of Chicago, Chicago, Ill.

SCHOOL GARDEN ASSOCIATION OF AMERICA.—December 29 and 30. President, Van Evrie Kilpatrick, 124 West 30th St., New York, N. Y.

GAMMA ALPHA GRADUATES SCIENTIFIC FRATERNITY.—Will meet on dates to be announced. President, Professor W. J. Meek, University of Wisconsin; recorder, L. C. Johnson, 2018 Madison St., Madison, Wis.

SOCIETY OF THE SIGMA XI.—December 27. President, Dr. Charles S. Howe, Case School of Applied Science; secretary, Professor Henry B. Ward, University of Illinois, Urbana, Ill.

AMERICAN ASSOCIATION OF UNIVERSITY PROFESSORS.—December 29 and 30. President, Dr. John H. Wigmore, Northwestern University; secretary, Dr. H. W. Tyler, Massachusetts Institute of Technology.

MEETINGS OF SECTIONS OF THE AMERICAN ASSOCIATION

As already announced, there will be a symposium "On the Structure of Matter" in a joint meeting of Sections B and C of the American Association for the Advancement of Science, the American Chemical Society, and the American Physical Society, on Wednesday, December 27, 10 A.M. and 2 P.M., in Room 309, Havemeyer Hall, Columbia University. The topics and speakers, arranged for to date, follow:

"Radiation and Atomic Structure," by Robt. A. Millikan. (The address of the president of the American Physical Society.)

"The Atom and Chemical Valence," by Gilbert N. Lewis. Address of the chairman of the section.

"Molecular Resonance and Atomic Structure," by Robt. W. Wood.

"The Relations of Magnetism to the Structure of the Atom," by Wm. J. Humphreys.

"The Relations of Magnetism to Molecular Structure," by Albert P. Wills.

"The Evolution of the Elements as Related to the Structure of the Nuclei of Atoms," by Wm. D. Harkins.

"Electromerism, a Case of Chemical Isomerism Resulting from a Difference in Distribution of Valence Electrons," by Lauder W. Jones.

It is planned to secure speakers to open the discussion; but, as the whole day is to be devoted to this question, it is hoped that others will come prepared to contribute.

The program of meetings of Section D—Engineering—for the New York meeting is as follows:

10.00 A.M., Thursday, December 28, Room 402 Engineering Building, Columbia University. Session for presentation of research papers in various fields of engineering. Presiding officer, Dr. Henry M. Howe.

2.00 P.M., Thursday, December 28, Assembly Hall, Automobile Club of America, 247 West 54th Street. Joint session of Section D with Society for the Promotion of Engineering Education, the National Highways Association, the National Automobile Chamber of Commerce, and the Automobile Club of America. Subject: "Highway Engineering Instruction in Civil Engineering Curricula." Presiding officer, Dr. Hollis Godfrey, first vice-president, Society for the Promotion of Engineering Education.

8.00 P.M., Thursday, December 28, Assembly Hall, Automobile Club of America. Joint session of Section D with the National Highways Association, Citizens' Street Traffic Committee of Greater New York, and the Automobile Club of America. Subject: "Research Papers in Highway Engineering." Presiding officer, Dr. Henry M. Howe.

8.30 P.M., Friday, December 29. Auditorium, United Engineering Societies Building, 29 West 39th Street. Joint session of Section D with the American Society of Civil Engineers, American Society of Mechanical Engineers, American Institute of Electrical Engineers and American Institute of Mining Engineers. Presiding officer, Dr. Henry M. Howe, introduced by the president of the Engineering Foundation, Dr. Gano Dunn. Address by retiring vice-president, Dr. Bion J. Arnold. Addresses by representatives of the National Engineering Societies re Interrelationship of Engineering and Pure Science. Meeting to be followed by a reception tendered to the American Association for the Advancement of Science by the National Engineering Societies.

Section G—Botany—will hold a joint meeting with the Botanical Society of America and the American Phytopathological Society in the auditorium of Horace Mann School, Broadway and 120th Street, on Wednesday, December 27, at 2:00 P.M., when the program will be as follows:

"Geographical Distribution of the Marine Algæ" (vice-presidential address), by W. A. Setchell.

Symposium on Relations of Chemistry to Botany:

"The Service of Chemistry to Botany," by C. L. Alsberg. (Discussion introduced by H. M. Richards.)

"Antagonism and Permeability," by W. J. V. Osterhout. (Discussion introduced by H. M. Benedict.)

"Physical Chemistry in the Service of Phytogeography," by J. A. Harris. (Discussion introduced by B. E. Livingston.)

The symposium will be followed by a short business meeting of Section G. The members of Sections G and F are invited by the New York Zoological Society to a reception and smoker to be held at the New York Aquarium, Battery Park, Wednesday evening, December 27.

Section L—Education—will hold its meetings at Teachers College, on December 27, 28 and 29. The program of fifty papers dealing with the scientific study of educational problems in many different fields of school work should prove attractive to superintendents, teachers and students of education. Many persons well known for their educational work will contribute to the program. Professor E. L. Thorndike will discuss "The Reliability of Certain Educational Tests"; Dr. Abraham Flexner, of the General Education Board, will speak on the work of the board; Frank G. Gilbreth and Lillian Moller Gilbreth, leaders in the application of micro-motion study to

problems of industrial education will report the effect of auto micro-motion study on educational methods in teaching typewriting and manual training; Professor Earl Clarke, of the Russell Sage Foundation, will present a paper on "The Relationship between the Indebtedness of City School Systems and Current Expenditures for the Operation and Maintenance of Schools." The names of Goddard, Rapeer, Heck, Trabue, Meriam, Mead, Kelly and many others well known for their contributions to current educational literature and methods, serve to indicate that those attending the meetings of Section L will be well repaid for their trouble. Sessions of the section will be held each morning and afternoon on Wednesday, Thursday and Friday. The Friday morning session will be a joint meeting with the American Psychological Association. The address of the retiring vice-president, Elwood P. Cubberley, of Leland Stanford Junior University, will be on Thursday afternoon.

SCIENTIFIC NOTES AND NEWS

MEMBERS of the American Association for the Advancement of Science whose dues are paid later than January 1, will receive the back numbers of SCIENCE only on payment of one cent a number to cover the extra cost of mailing. It can not be guaranteed that the copies will be supplied, as, owing to the extraordinary increase in the cost of paper, only so many extra copies will be provided as are likely to be needed. The offices of the permanent secretary of the association and of SCIENCE will be greatly assisted by the prompt payment of dues.

DR. HUGO MÜNSTERBERG, distinguished psychologist and author, professor of psychology and director of the psychological laboratory of Harvard University, died suddenly while lecturing to a class on December 16. Professor Münsterberg was born in Danzig in 1863 and was called from Freiburg to Harvard University in 1892.

THE public lectures of the approaching meeting of the American Association for the Advancement of Science will be given by Dr. Simon Flexner, director of the laboratories of the Rockefeller Institute for Medical Research, and by Dr. A. A. Noyes, professor of physical chemistry at the Massachusetts Institute of Technology. Dr. Flexner's lecture on "Infantile Paralysis and the Public Health" will be given at Columbia University at five o'clock on the afternoon of Thursday, December 28. Professor Noyes's lecture on "Nitrogen and Preparedness," will be given on the evening of the same day at the American Museum of Natural History.

MR. THEODORE ROOSEVELT will make the principal address at the opening of the New York State Museum at Albany on the evening of December 29, his subject being "Productive Scientific Scholarship." Among those who will make addresses at the afternoon exercises are Dr. John H. Finley, president of the University of the State of New York; Dr. Charles D. Walcott, secretary of the Smithsonian Institution, and Dr. John M. Clarke, director of the State Museum.

THE Bruce gold medal of the Astronomical Society of the Pacific for the year 1917 has been awarded to Professor E. E. Barnard, of the Yerkes Observatory, for his distinguished services to astronomy. The formal presentation will take place at the annual meeting of the society at San Francisco, on the evening of January 27. This is the fourteenth award of the medal.

THE 1917 meeting of the Pacific Division of the American Association for the Advancement of Science will be held at Stanford University, California, between the dates of April 4 and 7. It is anticipated that Thursday and Friday, April 5 and 6, will become the principal days for meetings of the several Pacific coast societies which will participate in this occasion. Further announcements concerning the meetings, railroad rates and excursions will be made later.

FIFTEEN members of the American Association for the Advancement of Science residing in the city of Rochester, N. Y., held a meeting recently and organized the Rochester Branch of the association. The executive committee consists of H. L. Fairchild, *chair-*

man; H. A. Carpenter, *secretary;* C. C. Hopkins, Adolph Lomb and C. E. Kenneth Mees. The association now has about forty members in the city and the number is increasing. It is not the intention of the Rochester Branch to compete in any manner with the numerous scientific societies in the city, but it aims to do locally what the association is doing in the national field; that is, to stimulate general interest in scientific study, to secure more scientific operation of the city housekeeping, and to act as the correlating body for greater union and effectiveness of the scientific forces in the city, which has a remarkable development of applied science.

At the annual election of the New York Academy of Medicine on December 7, the following officers were elected: President, Dr. Walter B. James; vice-president, Dr. Edwin B. Cragin; trustee, Dr. Charles L. Dana; member of committee on admissions, Dr. Samuel A. Brown, and member of committee on library, Dr. Warren Coleman.

At the seventy-first annual meeting of the Smithsonian Institution held in Washington on December 14 the resignation of Dr. Andrew D. White as a regent was presented and accepted, the board adopting a resolution of appreciation of his nearly thirty years of service. Dr. White wrote that with advancing age he found it impossible to attend to the duties. Representative James T. Lloyd, of Missouri, was appointed to succeed Maurice Connolly, of Iowa, whose Congressional term had expired.

The five members of the International Health Board Commission of the Rockefeller Foundation, which left June 15 for South and Central America to study yellow fever and other contagious tropical diseases, have returned to the United States. The commission was headed by Major-General William C. Gorgas, U. S. A., and included Dr. Henry R. Carter, of the United States Public Health Service; Dr. C. C. Lyster, Dr. Eugene R. Whitmore, Dr. William R. Wrightson and Dr. Juan Guiteras, head of the Public Health Service of Cuba. Dr. Guiteras stopped at Barbados to investigate reported yellow-fever conditions there. General Gorgas said that the members of the commission had a very successful trip, and that details of their investigations and their recommendations would be made public through the Rockefeller Foundation.

Dr. Waldon E. Muns, formerly of Bellevue Hospital laboratory, New York, has been appointed first assistant bacteriologist in the Syracuse city laboratory, succeeding Dr. William L. Culpepper, who resigned to accept a position with the International Health Board of the Rockefeller Foundation.

Dr. Rudolf Rubrecht, for several years research chemist in the chemical laboratory of the Massachusetts Agricultural Experiment Station, has resigned to accept an industrial position in Philadelphia.

Arrangements have been completed by the American Museum of Natural History for an exhibit of some of Charles R. Knight's recent paintings and small bronzes of modern animals and also of a mural decoration of prehistoric animals in the West Assembly Hall of the Museum from December 15, 1916, to January 15, 1917.

Dr. William W. Keen (Brown, '57), emeritus professor of surgery at Jefferson Medical College, will deliver three lectures on January 10, 15 and 17 on the Colver Foundation of Brown University, taking as his subject: "Medical Research and Human Welfare." The lectures will be "the record of personal experience and observation during a professional life of fifty-seven years."

Professor Mary W. Calkins, of Wellesley College, is this year the lecturer in philosophy on the Mills Foundation at the University of California. Her subject is "The Fundamental Problems of Philosophy."

The first lecture in the Adolfo Stahl Lecture Course in Astronomy was given in San Francisco, on the evening of November 10, 1916, by Dr. W. W. Campbell, on the subject "The Solar System." The course is given under the auspices of the Astronomical Society of the Pacific, and provision for it was made by

Mr. Adolfo Stahl, a public-spirited citizen. The course will include five additional lectures, all free to the public, as follows:

December 8, 1916, "Comets," W. W. Campbell.

January 12, 1917, "A Total Eclipse of the Sun," R. G. Aitken.

February 9, 1917, "Double Stars and Star Clusters," R. G. Aitken.

March 9, 1917, "The Nebulæ," H. D. Curtis.

April 6, 1917, "How Astronomical Discoveries are Made," H. D. Curtis.

PROFESSOR HENRY MELVILL GWATKIN, Dixie professor of ecclesiastical history in the University of Cambridge, England, died in November. He was known as a specialist in Mollusca, and his collection of Molluscan radulæ was doubtless the largest in existence. It is understood that this collection now goes to the British Museum.

PROFESSOR J. H. MERIVALE, formerly of Armstrong College, Newcastle, since engaged in mining engineering, died on November 18 at the age of sixty-five years.

LIEUTENANT CORIN H. B. COOPER, R.E., for a time demonstrator in geology at McGill University, and later engaged on government survey work in the oilfields of the Rocky Mountains, has been killed in the war.

THE directors of the Fenger Memorial Fund announce that the sum of $500 has been set aside for investigation in medicine or surgery in 1917. The money will be used to pay all or part of the salary of a worker, the work to be done under direction in an established institution, which will furnish the necessary facilities and supplies free of cost. It is desirable that the work undertaken should have a direct clinical bearing. Applications giving full particulars should be sent to Dr. L. Hektoen, 629 S. Wood St., Chicago, before January 15, 1917.

THE Naples Table Association for Promoting Laboratory Research by Women announces the offer of the Ellen Richards Research Prize of $1,000 for the best thesis written by a woman embodying new observations and new conclusions based on independent laboratory research in biology (including psychology), chemistry or physics. Theses offered in competition must be in the hands of the chairman of the committee on the prize before February 25, 1917. Application blanks may be obtained from the secretary, Mrs. Ada Wing Mead, 283 Wayland Avenue, Providence, R. I.

THE Sarah Berliner Research Fellowship for Women of the value of $1,000 is offered annually, available for study and research in physics, chemistry or biology. Applicants must already hold the degree of doctor of philosophy or be similarly equipped for the work of further research. Applications must be received by the first of February of each year. Further information may be obtained from the chairman of the committee, Mrs. Christine Ladd-Franklin, 527 Cathedral Parkway, New York.

FORTY-SEVEN students who recently passed final examinations of the Faculty of Medicine, University of Toronto, have enlisted for service in the medical corps, and will leave in the immediate future for overseas service. A special convocation was held on the evening of November 28 in Grant Hall, Queen's University, Kingston, Ont., at which sixty-three medical graduates were granted their degrees. All these graduates will go overseas shortly to serve at the front.

LEGISLATION has recently been enacted which will provide for approximately 300 additional medical officers in the Medical Corps of the United States Navy. The pay ranges from $2,000 per year, with quarters or an allowance therefore, for assistant surgeons with the rank of lieutenant, junior grade, to $8,000 with allowances upon attaining the grade of medical director with the rank of read admiral of the upper half. Applicants must be between the ages of 21 and 32 years, citizens of the United States, and must submit satisfactory evidence of preliminary and medical education. The examination for appointment in the medical corps consists of two stages, the first stage securing appointment in the Medical Reserve Corps, and the second stage securing an appointment as a commissioned officer in the regular medical corps. After the candidate passes the preliminary examination he attends

a course of instruction at the Naval Medical School. During this course he receives full pay and allowances of his rank, and at the end of the course he takes a final examination. Two of these courses begin each year, one commencing about the first of October, and the second course beginning early in February. The examinations are held in several of the coast cities in the United States, both on the east coast and the west coast, and also at Chicago, Ill. Literature describing the navy as a special field for medical work, and circulars of information for persons desiring to enter the medical corps, may be obtained by addressing the Surgeon General, U. S. Navy, Navy Department, Washington, D. C.

UNIVERSITY AND EDUCATIONAL NEWS

By the will of Mrs. Mary W. Harkness, widow of Charles W. Harkness, about $1,100,000 is bequeathed to public purposes. The largest bequest is $300,000 to Yale University, the income to be used in the payment of salaries of officers of instruction.

Boston University has received an anonymous gift of $100,000 for scholarships for young men in the college. The gift is made in honor of Augustus Howe Buck, emeritus professor of Greek.

Professor and Mrs. William A. Herdman, of the University of Liverpool, have given to the university the sum of £10,000 for the endowment of a chair in geology in memory of their son, who was killed in the war.

Paul Sabine, of Harvard University, has been appointed assistant professor of physics at the Case School of Applied Science and will have charge of the physics laboratory.

Dr. A. R. Davis, formerly research assistant at the graduate laboratory, Missouri Botanical Garden (Shaw School of Botany, Washington University), has been appointed assistant professor of botany at the University of Nebraska. Mr. R. A. Studhalter and Mr. H. C. Young, formerly Rufus J. Lackland research fellows in the same institution, have been appointed, respectively, assistant botanist in the Montana Agricultural Experiment Station and instructor in botany in the Michigan Agricultural College. Miss Ruth Beattie has accepted a position as instructor in botany at Wellesley College.

At the University of Sheffield Dr. W. E. S. Turner has been appointed lecturer in charge of the new department of glass technology.

DISCUSSION AND CORRESPONDENCE

PSYCHOLOGY AND MEDICAL EDUCATION

To the Editor of Science: In your issue of November 10, Dr. Cecil K. Drinker has approached the problem of advising students planning to enter the medical profession as to what courses over and above those required they can most profitably give their attention to during their college years. Dr. Drinker has urged the undergraduate to take as much physics and chemistry as possible: I should like to enter a similar plea in favor of psychology.

The importance of a knowledge of psychology to all persons engaged in the practise of medicine is, no doubt, widely recognized by both practitioners and teachers of that science and art to-day, and the value of psychological study as a part of medical education received special attention in a symposium and report on the subject in Science for October 17, 1913. Little has been heard of the matter recently, however, and I feel it can do no harm to bring up the subject again in the hope that real interest may be aroused in pushing it more effectively to the front.

The conclusions of the report referred to clearly enunciate the need of more cooperation than is at present existent between psychologists and—not only psychiatrists, whose concern is primarily with the problems of the diseased mind—but also the physicians of the body. For all schools of psychology to-day acknowledge and even emphasize the inseparableness of mental states and processes from the physiological conditions which underlie or at least invariably accompany them, and medical men are fully aware of the influence which mental states have upon the health of the body.

But I am especially interested here in adding to what was said by Dr. Franz's commitee a word for the subject of *abnormal* psychology in a premedical course. A glance at any of the text-books on mental disorders—such as those of Stoddart or Diefendorf—reveals at once psychological conceptions of the crudest nature. In the medical school, when the student's attention is necessarily directed entirely to the body side of that complex affair called the human individual, it is but natural that a strongly materialistic bias should develop which, if not counterbalanced by a predirected emphasis on the side of the psychical, is certain to issue finally in a complete loss of the necessary scientific equilibrium. The medical school teacher delights in demonstrating to his pupils that the phenomena of insanity are merely symptoms of diseases of the brain and nervous system, which can be explained in purely physiological terms without invoking any non-material influences. Now this may all be true, but certainly it is but fair that the psychologist should be given his opportunity to demonstrate also that those same phenomenon can be fully described, and many of them explained, in purely mental terms without referring to the brain or nervous system at all, and that a purely psychological *description* is in many cases the only really valid and useful one. It would be well, of course, if all psychologists and all physicians were broad-minded enough to appreciate equally the mental and the physiological factors in human life, but this is perhaps too much to expect of any infra-angelic intelligence! Such being the weakness of the human intellect, therefore, we can but recognize it, and seek to overcome the one-sidedness of the physician's outlook by the other-sidedness of the psychologist's viewpoint.

For the reassurance of the physician it may be well to add that, on the principle that "he who laughs last laughs best," no possible harm can be done by accepting the suggestions I urge, as it is the medical school teacher who will have the last shot at the student and thus the better chance of influencing his views for the future. Furthermore I am convinced that a firm preliminary grounding of the student in the principles of the normal *and abnormal* mind as the psychologist studies them can not but be of the greatest positive value to the physician.

JARED S. MOORE
WESTERN RESERVE UNIVERSITY

THE RETENTION OF OIL BY CLAY AT WATERVILLE, MAINE

WHILE attempting to unravel the extent of the post-Pleistocene terrace at Waterville, I had occasion to ask one of the railroad officials, Mr. Thomas Harrold, whether the railroad yards are underlain by clays or the slate ledge which outcrops near by. He informed me that they are underlain by clay and gave the following interesting facts in explanation of his knowledge. In March, 1911, he was superintending the installation of a new set of scales in the Waterville yards. During the excavation for the foundation, clay was encountered a few feet below the surface and a fluid, supposedly water, collected in the hole. Further examination showed this to be kerosene, and about five barrels were removed. The presence of the oil was explained when it was remembered that in 1909 the contents of a tank car had been lost in the yards.

Several years after the events recorded above, in the summer of 1914 or 1915, came a period of unusually heavy precipitation. The water table over the clay rose near the surface and kerosene began to collect in the drainage ditches near the tracks. One man is said to have collected eleven barrels of the kerosene and the adjoining population were so active in digging pits to collect the fluid that the tracks were undermined and the railroad officials found it necessary to prohibit the removal of the oil.

These are the facts as reported to me. I might add that the railroad yards are just to the west of the Kennebec River. The river flows in a slate gorge here, the rock extending to the top of the bank on this side; then comes a flat of 10–15 feet representing the old railroad bed; back of this the ledge is overlain immediately by the fill beneath the present tracks.

The writer has many times noticed the large amount of oil which covers the flat, killing vegetation and sending out a disagreeable bituminous odor. I had always supposed that the oil must represent the concentration from cotton waste, etc., collected there year after year, especially as large car shops are nearby. The true explanation, bringing out as it does the retention of the oil by the clay and the response to ground water conditions, seemed to make a note of the facts worth placing on record.

Homer P. Little

Waterville, Maine

THE RECOGNITION OF ACHIEVEMENT

There are probably a good many successful scientific men in America who will echo in some measure the sentiments expressed by W. E. Allen in a recent issue of Science. There certainly should be some method of distinguishing individuals who have attained eminence in their respective lines irrespective of whether they hold a doctor's degree or not. Even the holder of such degrees may well join in a movement to distinguish the real workers from those who have merely secured degrees. It is clear that the doctor's degree does not necessarily indicate exceptional merit; in fact the degree itself has varying shades of importance. A man who has been educated in a prominent institution is much more inclined to write the name of the university after the degree than he is if his university is less prominent.

To the man with a degree, it may seem absurd for others who are not doctors to suggest a distinguishing mark for meritorious work but if such marks are not desirable, why attach college and university degrees to an individual at all? Is the mere fact that he has gone through a prescribed course in a university to be forever remembered regardless of the quality of his work in after years, or shall we demand that he measure up to his promises when the degree was conferred; in short, is it schooling or achievement that shall count?

As time goes on and doctors continue to increase in numbers, some such distinction as has been suggested will become increasingly desirable. This seems a good time to do something about it.

Willard N. Clute

Joliet, Ill.

CLOUDS

Since the many forms of fog and cloud reveal, as obviously nothing else can, the motions and conditions of the atmosphere, it would seem that their every type must have been the object of innumerable photographic records, and that nothing could be easier than to make a reasonably complete collection of such photographs.

This, however, at least so far as making the collection is concerned, is not the case. Some clouds, such as the mammato-cumuli, the scarf-like wisps that form above thunder heads, the tornado's funnel and several others of somewhat infrequent occurrence appear rarely to be photographed—I have never seen a good photograph of any one of them—while even the more common clouds seem generally to be photographed with inadequate equipment.

To obtain the best photographs of cirri, for instance, that is, to secure such contrast that the finer details may be seen, it is absolutely necessary to use some sort of device by which the maximum amount of polarized sky light may be cut out. Needless to say this is seldom done. Similarly, if one would accentuate the beauty of his cloud picture by including an interesting landscape it is obvious that he must use a suitable ray filter. Finally, as the clouds are drifting, often with considerable velocity, the exposures must be practically instantaneous.

But difficult as photographing clouds may be surely some enthusiasts must have accumulated many fine pictures of them, and I am taking this opportunity of asking if those who have exceptionally fine cloud and fog pictures will not kindly write to me of them, as I am anxious to obtain good examples of every type for the purpose of study and comparison. Of course none would be reproduced without permission and proper acknowledgment.

W. J. Humphreys

U. S. Weather Bureau,
Washington, D. C.

SCIENTIFIC BOOKS

A Text-book of Biology for Students in General, Medical and Technical Courses. By WILLIAM MARTIN SMALLWOOD, Professor of Comparative Anatomy, Syracuse University. Philadelphia, Lea and Febiger. 1916. 317 pages, 261 engravings and 10 plates.

If a healthy interest in the method of teaching elementary zoology may be inferred from the number and variety of text-books appearing we may congratulate ourselves upon our present state. It is clear, however, from the varied character of the materials treated, that there is as yet no agreement regarding the matter which should enter into such a course. Since almost every phase of the subject has been presented, through methods of great diversity, it would seem possible that in time the experience of many teachers in widely different surroundings would point to the types of books best suited for elementary instruction. Judging by numbers, the present tendency would seem to be toward some very general treatment to which the term "biology" might be given. Some of these books have been long enough in service to have passed the first edition stage, and of these Smallwood's "Textbook of Biology" is one. This now appears in the "second edition, thoroughly revised and enlarged." A change in the title may be significant of an altered viewpoint of the author. In the first edition it is stated that the book is "for students in medical, technical and general courses" but in the present edition the last is made first and emphasis is placed on "general courses" by their early mention. Specific statement is also made of the importance of breadth of training in the preface, and, although this occurs in a reference to the purpose of the earlier edition, it is evident that the author has come to place additional value upon the underlying general principles of the subject. While he doubtless felt like "leaving their application to the teachers of advanced zoological, botanical and professional courses" at the time of writing the book, he is now strongly enough of the opinion to say so.

It is to be hoped that this is an indication of a general change in attitude toward too much of the "applied" in elementary biological instruction. That the author should be encouraged to announce his position more definitely on this point because of the formulated opinion of teachers of anatomy is very encouraging to all who believe in the value of thorough preparation in general subjects and who rightly feel they should have the support of those who teach the more specific and applied branches.

Such a conception of the relation of general to applied biology does not, however, signify to the author of the text that his subject-matter must be remote from experience or removed from practical interest, as is indicated by Chapter XV., which deals with "some biological factors in disease." Indeed, the length of this chapter in comparison with others—it exceeds the one devoted to "The Plant Kingdom"—and the details of disease symptoms recorded might incline a captious critic to question the emphasis claimed for broad principles. In this attitude he would be strengthened by the criterion adopted for an inclusion of a study of the Pelecypods in the book—this being that "clams and oysters are so generally used as food and so frequently cause disease" (p. 157). But the temptation to popularize our subjects is great, so it is not well, perhaps, to blame the author overmuch for occasional lapses toward the "practical."

There is now little chance in general texts to introduce anything new in the arrangement of the subjects, but Smallwood endeavors to add this touch by emphasizing the historical development of biology in the sequence of chapters. Since this represents the natural approach to the subject and follows the course of improvements in technique and instruments, it can not be far wrong practically. "The earlier chapters (I.–IX.) of this work, accordingly, take him (the student) through a consideration of the organism as a whole, the structure and function of organs, the structure and properties of tissues, and the parts of the cell and their work. The chapter devoted to the biology of cells furnishes the basis for the modern point of view and acts as a background for the remainder of the book." The topics of

these later chapters are "XI., Biology of Bacteria, Yeast and Moulds; XII., Classification—the 'Worms,' Mollusca and Arthropods; XIII., The Plant Kingdom; XIV., Some Biological Adaptations; XV., Some Biological Factors in Disease; XVI., Evolution; XVII., Variation-heredity; XVIII., Animal Behavior and Its Relation to Mind." From this outline it will be seen that the author maps out a very extensive program and it is not surprising that consideration of many topics is very brief, and, almost necessarily, inadequate many times. An account of "The Plant Kingdom" in 23 pages can not be very satisfying.

The style of the book is readable, but unfortunately is marred by many loose statements and faulty definitions. The cell is stated to be composed of the "nucleus" and "cytoplasm"—a structure and a substance, instead of nucleus and cytosome—structural subdivisions. Many examples of such definitions appear throughout the book. Physiology is defined as "the work that an organism does or the work of its parts"; metamorphosis as "a name given to the life-history of insects, frogs, etc."; symbiosis as "the living together of dissimilar plants or animals or a plant and an animal." The illustrations are good and are properly chosen to represent other forms than the ones used in the laboratory. No laboratory outlines are given and the brief and very general chapter headings, called "Laboratory Studies," would be of no service to a competent teacher and are far too general to help an untrained one. They could properly be omitted.

C. E. McClung

SPECIAL ARTICLES

THE CAUSE OF THE DISAPPEARANCE OF CUMARIN, VANILLIN, PYRIDINE AND QUINOLINE IN THE SOIL

PRELIMINARY NOTE

Considerable attention has been devoted recently to the fact that organic substances which are toxic to higher plants in water culture lose their toxicity when added to the soil.[1] This depends, however, on the soil.[2] This loss of toxicity would seem to be due to the fact that the substances, as such, disappear in the soil.[3] Funchess[4] has also found that many of the organic nitrogenous compounds toxic to plants in water culture are apparently nitrified in the soil. This would point to their disappearance as being due to biological causes. Some observations made by the writer during the past year on the cause of the disappearance of four of these compounds may prove suggestive to those who are investigating this problem.

Cumarin, vanillin, pyridine and quinoline were added separately at a concentration of 1,000 parts per million to soil in pots. This soil was similar to that used by Funchess,[5] in which the organic toxins were found to lose their toxicity or even become beneficial to plant growth. The number of microorganisms developing in the treated pots and in the check pots was determined at intervals over a period of about three months. In each case the numbers of microorganisms increased enormously in the treated pots, after, in some cases, an initial depression in numbers. The phenomenon appeared entirely analogous to that found in partial sterilization.

In order to determine whether microorganisms are concerned in the destruction of the substances named above, the compounds were added to sterile soil in two liter bottles. Part of each set of bottles, treated with one of the four substances mentioned above, was inoculated with an infusion from normal soil. The bottles were incubated about two months at room temperature. At the end of that time sterile wheat grains were planted in the bottles. The growth of the wheat plants showed that in the inoculated soil the toxic properties of the vanillin, cumarin, pyridine and quinoline had largely disappeared, but were still very evident in the bottles containing sterile soil. This seemed to indicate that

[1] Davidson, J., *Jour. Am. Soc. Agr.*, 7: 145–158, 221–238 (1915). Upson, F. W., and Powell, A. R., *Jour. Ind. and Engin. Chem.*, 7: 420–422 (1915). Fraps, G. S., Texas Ag. Ex. Sta. Bul., 174 (1915). Funchess, M. J., Alabama Ag. Ex. Sta. Tech. Bul., 1 (1916).

[2] Skinner, J. J., U. S. Dep't Agr. Bul. 164 (1915).

[3] Fraps, *loc. cit.*

[4] Unpublished data.

[5] *Loc. cit.*

the disappearance of the compounds was chiefly due to biological causes.

From the bottles or pots three species of bacteria were isolated, one of which uses pyridine as a source of nitrogen, one vanillin as a source of carbon and one cumarin as a source of carbon. An organism acting on quinoline has not yet been found.

This would seem to show that the enormous increase in numbers of organisms noted in the treated pots and the disappearance of the four substances in the soil depend on the fact that they (the compounds) serve as food sources to definite species of bacteria.

The significance of these facts to the soil toxin theory of soil fertility is evident. The persistence of vanillin, for example, in some soils and not in others may be due to the fact that the vanillin organism is absent or to the fact that conditions are not suitable for its development or for the use of the vanillin. If we should be able to improve a soil containing vanillin by treating it with the vanillin organism the results should be a strong argument for the soil-toxin theory of soil fertility. This of course is a step into the future.

The results are also suggestive in explaining some of the phenomena accompanying "partial sterilization." They would suggest that in "partial sterilization" (at least that caused by these four compounds) we do not have a large increase in the numbers of microorganisms because the less resistant are killed and the resistant forms given opportunity to develop; or because voracious protozoa are eliminated; but because the sterilizing agent used serves directly[6] as a food source. In the case of steam, and perhaps carbon bisulphide, unavailable food supplies are probably made available.

WILLIAM J. ROBBINS

DEPARTMENT OF BOTANY,
ALABAMA POLYTECHNIC INSTITUTE,
AUBURN, ALABAMA

SOCIETIES AND ACADEMIES

THE AMERICAN PHYSICAL SOCIETY

THE eighty-fifth regular meeting of the American Physical Society was held in the Ryerson Laboratory of the University of Chicago on Saturday, December 2.

The following papers were presented:

"On the Velocity of Sound in Metal Tubes," by Karl K. Darrow, University of Chicago.

"Collapse of Thin Tubes Shorter than the Critical Length," by A. P. Carman, University of Illinois.

"An Acoustical Thermometer," by F. R. Watson and H. T. Booth, University of Illinois.

"A General Method of producing the Stroboscopic Effect, and its Application in the Tonodeik," by L. E. Dodd, State University of Iowa.

"The Intensity-factor in Binaural Localization and an Extension of Weber's Law," by G. W. Stewart and O. Hovda, State University of Iowa.

"An Apparatus for the Demonstration to an Audience of Simple Harmonic Motion," by Paul E. Klopsteg, University of Minnesota.

"Report of Progress on the Measurement of Earth Rigidity," by A. A. Michelson and Henry G. Gale, University of Chicago.

"The Accuracy with which Gravity may be predicted at any Point in the United States," by John F. Hayford, Northwestern University.

"A Proposed New Method for the Determination of the Acceleration due to Gravity," by Herbert Bell, University of Michigan.

"On Some Very Large Variations in the Adsorption of certain specimens of Charcoal," by Harvey B. Lemon, University of Chicago.

"The Principle of Similitude," by C. S. Frazel, University of Illinois.

"Preliminary Notes on the Torsional Elasticity of Drawn Tungsten Wires," by L. P. Sieg, State University of Iowa.

"A Precision Calorimeter for measuring Heats of Dilution," by D. A. MacInnes and J. M. Braham, University of Illinois.

"Note on the Amount of Error in applying to Non-Parallel Plates the Formula for Electrical Capacity of Parallel Plates," by L. E. Dodd, State University of Iowa.

"The Kinetic Theory of Non-Spherical Rigid Molecules," by Yoshio Ishida, University of Chicago.

"The Photo-electric Emission from Crystals of Selenium," by F. C. Brown, State University of Iowa.

"The Production of Light by Cathode Rays in Air," by Gordon S. Fulcher, University of Wisconsin.

"The Optical Constants of Liquid Alloys," by Carleton V. Kent, University of Michigan.

"The Single-lined and the Many-lined Spec-

[6] This has been suggested for pyridine. See Buddin, W., *Jour. Agr. Sci.*, 6, 416–451 (1914).

trum of Mercury,'' by T. C. Hebb, University of Chicago.

''Note on the Single-lined and the Many-lined Spectrum of Mercury,'' by R. A. Millikan, University of Chicago.

''The Structure of the Bismuth Line at Wave-length 4722,'' by Henry G. Gale and Lester Aronberg, University of Chicago.

''Visual Diffusivity,'' by Herbert E. Ives, United Gas Improvement Co., Philadelphia.

''Measurement of Wave-lengths with the X-ray Spectrometer,'' by Elmer Dershem, State University of Iowa.

''A Single Bar and Yoke Method for the Magnetic Testing of Iron Bars,'' by Arthur Whitmore Smith, University of Michigan.

''Some Effects of Cross-Magnetizing Fields on Hysteresis,'' by N. H. Williams, University of Michigan.

''A. C. and D. C. Corona in Hydrogen,'' by John W. Davis, University of Illinois.

''The Magnetic Properties of Fe, Ni and Co above the Curie Point, and Keesom's Theory of Magnetization,'' by Earle M. Terry, University of Wisconsin.

''A Simple Method for determining the Audibility Current of a Telephone Receiver,'' by Edward W. Washburn, University of Illinois.

''An Extension of the Mayer Experiments,'' by R. R. Ramsey, Indiana University.

''The Derivation of the Retarded Potentials,'' by Max Mason, University of Wisconsin.

''The Mass of the Electric Carrier in Copper, Silver and Aluminium,'' by Richard C. Tolman and T. Dale Stewart, University of Illinois.

''An Experimental and Theoretical Investigation of Binaural Beats,'' by G. W. Stewart, State University of Iowa.

''Contact Electro-motive Forces and the Energy of Emission of Electrons under the Influence of Monochromatic Light,'' by R. A. Millikan, University of Chicago.

''The Permanence of the Wave-length Sensibility Characteristics of Photo-electric Cells,'' by Herbert E. Ives, United Gas Improvement Co., Philadelphia.

''An Effect of Light on the Contact Potential of Selenium and Cuprous Oxide,'' by E. H. Kennard and E. O. Dieterich, University of Minnesota.

''A Peculiar Gas-Crystal Resistance Change in Selenium,'' by W. E. Tisdale, State University of Iowa.

''The Variation in the blackening of a Photographic Plate with Time of Exposure, Total Energy Remaining Constant,'' by P. S. Helmick, State University of Iowa.

''Note on the Ionizing Potential of Metallic Vapors,'' by H. J. van der Bijl, New York City.

A. D. Cole,
Secretary

THE BIOLOGICAL SOCIETY OF WASHINGTON

The 558th meeting of the society was held in the Assembly Hall of the Cosmos Club, Saturday, October 21, 1916, called to order at 8.10 by President Hay, with 50 persons in attendance.

The president announced the death of Professor F. E. L. Beal, a member of the society, distinguished for his work in economic ornithology.

On recommendation of the council Mrs. Ella M. Enlows was elected to active membership.

Under the heading brief notes, exhibition of specimens, the following informal communications were presented:

Mr. A. L. Quaintance called attention to a new peach pest (related to the coddling moth), lately found in the District of Columbia and immediate vicinity. These remarks were illustrated by lantern-slide views of the insect and its work.

Dr. C. W. Stiles commented on zoological nomenclature and gave notice that it was the intention to set aside the rules of strict priority with reference to *Holothuria* and *Physalia* and to use these terms for the animals to which they are currently applied in the usual text-books.

Dr. Stiles also commented on recent cases in which trichina had figured in certain lawsuits. He expressed the view that with the purchase of meat products went the requirement that the product should be properly cared for and that in the case of pork this care required cooking before consumption. It was somewhat unfair to hold the seller of trichinous meat entirely responsible.

Dr. L. O. Howard cited an instance in which a cockroach was figuring in a lawsuit. A man was suing a Texas railroad for damages on the ground that typhoid fever had been contracted through his drinking pop which had been contaminated by a cockroach, which had apparently been in the bottle before the man drank the pop purchased of the common carrier.

The regular program consisted of an illustrated lecture by Dr. Paul Bartsch: ''Mollusk Collecting in the Philippines.'' Dr. Bartsch reviewed the work of previous collectors, gave an account of his own collecting expedition, describing the methods and apparatus used; he spoke of mollusks as a source of food for the natives, their method of gathering

them; he called attention to the variations of these animals as found on different islands; showed the necessity of exact locality determinations on specimens; and discussed the geographic distribution of the Philippine molluscan fauna, pointing out its possible origin from other islands or land masses. The lecture covered not only the land mollusks, but the marine forms as well.

THE 559th meeting of the society was held in the Assembly Hall of the Cosmos Club, Saturday, November 4, 1916, called to order at 8 P.M. by President Hay, with sixty persons present.

On recommendation of the council the following persons were elected to active membership: Dr. Wm. B. Bell, Biological Survey; Francis Harper, Biological Survey; H. E. Anthony, American Museum of Natural History, and A. B. Howell, Covina, California.

The president announced the death of Dr. E. A. Mearns, a member of the council of the society and distinguished for his work in birds, mammals and other branches of natural history.

Under the heading of brief notes and exhibition of specimens, Dr. R. W. Shufeldt exhibited a specimen of the Japanese giant salamander and made some remarks on its habits and habitat.

The regular program consisted of four papers as follows:

A Review of Recent Work on the House-fly: R. H. HUTCHISON.

This paper was restricted to a discussion of recent studies on the preoviposition period, the range of flight and the question of the over-wintering of the house-fly. The remarks on the preoviposition period summarized a recent bulletin of the Department of Agriculture on this subject (Bulletin 345).

In discussing the range of flight, attention was directed to the fact that up to 1914 the longest recorded flight was 1,700 yards. During the season of 1915 experiments were carried out in a suburban locality near Washington by Max Kisliuk, Jr., under the direction of the writer. In these, several records of from 1,800 to 2,175 yards were obtained. These were compared with the records obtained by R. R. Parker during the same season at Miles City, Montana. His longest record was 3,500 yards.

The question of how the house-fly overwinters in this latitude was said to be still undecided. It was pointed out that flies were not killed by the first heavy frost, as has often been stated; in fact a large percentage revived after several nights' exposure to minimum temperatures of 25° F. They are killed by temperatures of 15° F. Flies were found emerging up to the first week in December, and these late forms were found in heated buildings until the end of January. None were again seen till April 27. Other observations were cited as indicating that flies do not overwinter in the adult state, but, on the other hand, a long series of experiments and observations failed to give any positive evidence that they overwinter in the larval or pupal state.

Recent Spread of the Cotton Boll Weevil: W. DWIGHT PIERCE.

A brief history of the movement of this pest through the United States suggests from a study of specimens collected in all parts of the infested regions of North America that there are three lines of dispersion. It seems probable that the boll weevil originated in Guatemala or some other portion of Central America and that the most typical strain migrated northward through the mountains of Mexico into Arizona, where it is now found as a native species on the wild cotton-like plant *Thurberia thespesioides*. The main migration was along the Gulf Coast through the cultivated cotton regions into the United States. The third line of dispersion was through Yucatan across the Gulf, to Cuba. Specimens collected at the three termini of these dispersions appear to be very distinct varieties. That variety which is found on cultivated cotton in the United States is the smallest found and the most variable. The movement of the weevil is controlled by the amount of food supply, which regulates the time and distance of natural movement by winds and floods; and by artificial agencies.

The most interesting development of the present year is the extension of the weevil to the northern limits of cotton growth in Oklahoma and Arkansas into Central Tennessee; eastward to the Atlantic Ocean south of Savannah; and the infestation of practically all the cotton region of Florida. The only Sea Island cotton section now not infested is that of South Carolina.

Remarks on Entomological Inspection and Disinfection of Products offered for Entry into the United States: E. R. SASSCER.

A brief review of the Plant Quarantine Act of 1912 was given, pointing out the principal features of the act relating to the control of stock entering the states and what is required of the broker, the nurseryman, or party importing plants or plant products. The quarantine relating to insects were referred to, and lantern slides of a number of these quarantined insects and others collected by inspectors were shown. Brief mention was made

of the method of examining nursery stock in the District of Columbia, and it was shown that such stock was naturally divided into commercial material, including plants and plant products received by florists, department stores and private individuals; and departmental material, including plants and plant products introduced by the various offices of the Department of Agriculture, more particularly the Office of Foreign Seed and Plant Introduction. Some time was devoted to discussing the new method of disinfecting cotton, and lantern slides were shown exhibiting the plants which are now operating in Boston, Mass., Brooklyn, N. Y., Newark, N. J. and Oakland, Calif.

An Outline of the Glow-worms of the American Family Phengodidæ: H. S. Barber.

M. W. Lyon, Jr.,
Recording Secretary

THE AMERICAN ASSOCIATION OF VARIABLE STAR OBSERVERS

On November 18, 1916, the American Association of Variable Star Observers held its fourth annual meeting at the Harvard College Observatory, Cambridge, Mass., at the invitation of the director, Dr. E. C. Pickering. The meeting was called to order in the library of the institution at three o'clock with twenty-two members present. The results of the previous year's work were carefully discussed and more definite plans adopted for the future course of the association. Numerous light curves and plottings pertaining to the work were on exhibition, illustrating the observations on variable stars, particularly those of long period.

Later, a tour of the observatory was made, at which time Professor Pickering and Miss Cannon explained in detail the work of the astro-photographic department, and Professor King explained the manipulation of the different photographic telescopes. This was followed by a lantern-slide exhibition of views of Arequipa, Peru, and the work of the Southern Station of the Harvard College Observatory by Mr. Campbell.

The meeting then adjourned to the commodious quarters of the 12-inch polar telescope, when nineteen experienced observers had the unique opportunity of observing the same variable star, *SS* Cygni, under like conditions, with an average deviation between observers of only 0.14 magnitude.

From seven until ten o'clock Professor Pickering acted as host at a dinner given to the members of the association. Following the dinner many of the members enjoyed the opportunity of observing with the historic 15-inch equatorial until the wee sma' hours of the morning.

The next day a small party availed themselves of the chance to visit the well-equipped students observatory at Wellesley College, by the courtesy of the director, Dr. J. C. Duncan.

In no period in the history of astronomy has an opportunity offered itself, as at the present time, whereby a group of amateur astronomers has been able to combine and organize themselves for such useful scientific work. In fact no other branch of science offers this possibility so completely, in which a two-fold purpose is so well accomplished, namely: service and contribution to science and personal pleasure to those taking part therein.

Not all the problems of astronomy are so easily adaptable or inviting to amateurs, as this study of variable stars. Nevertheless, in the past five years a most productive field of research has been developed, and one which has called together one of the most enthusiastic assemblages of men and women, some forty in number and from all the different walks of life.

The study of variable stars is one of the oldest branches of astrophysical astronomy, and it was not until twenty-five years ago that systematic work was undertaken. To this work the Harvard College Observatory has devoted, under the directorship of Dr. E. C. Pickering, the greater part of its time and resources. The methods and results in this study have proved so simple and attractive that it has lent itself admirably to non-technically trained astronomers, with the result that in 1911 there was formed this association of amateur observers, with Mr. Wm. Tyler Olcott as its secretary and prime mover. From the character of the work thus far performed, a number of its members have recently received recognition by election to membership in the American Astronomical Society. F. E. B.